APPLICATION OF DECISION-MAKING TRIAL AND EVALUATION

LABORATORY (DEMATEL) METHOD TO EXPLORE THE KEY FACTORS

TO IMPROVE PATIENT SAFETY CULTURE

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ABSTRACTS

Background

Patient safety has always been regarded as a global health-care problem, researches have shown that the patient safety culture not only maintains a fundamental aspect of patient safety, could also reduce and prevent medical errors (preventable adverse event) and improve quality of care.

Objective

This study aim to determine the effectiveness of patient safety culture strategies to improve patient safety in hospital, by using of DEMATEL method, to analyze the main influences to assist and guide hospital decision-makers in establishing patient safety cultural activities to enhance patient safety in priority

Methods

This study was using a Safety Attitude Questionnaire, and DEMATEL method for the preparation of the questionnaire. Object for hospital organizations to promote patient safety expert respondents to understand the attitude of patient safety culture assessment expert system to construct a key factor for the hospital. Results: 1.The six dimensions were determined; teamwork climate will affect the other facets. 2. in orders of the impacts as teamwork climate is greater than perceptions of management, perceptions of management is greater than working conditions, working conditions is the Greater than job satisfaction, and is greater than stress recognition, stress recognition is greater than safety climate. Conclusion

For the six key dimensions to improve patient safety culture, the best strategy would be to identify "teamwork climate" as the first priority to improve on, which would subsequently improve on other dimensions thus to improve in the overall patient safety.

KEYWORDS: Patient Safety, Patient Safety Culture, Safety Attitudes Questionnaire, Dematel

INTRODUCTION

BACKGROUNDS

The health care industry is considered as a high risk industry, with the high level of complexity, and full of uncertainties, hence with any errors occurred, regardless of the degree, will very likely to cause harm to the patient both physically and psychologically. Therefore, hospital institution and healthcare providers should focus on improving, and detail assessment on the wide spectrum of errors that could have occurred in nurses' working environment and identifying their impact on patient safety.

Patient safety issues are becoming more aware by the public and had been emphasized as a global health care problem(Patel & Wu, 2014).Studies have shown that patient safety culture is considered as the core element of the safe care, since it not only to improve quality of health care(Hamdan, 2013), as well as reducing medical errors, safety hazards and identifying important tasks could lead to a significant improvements in quality and patient safety(Kaya, Barsbay, & Karabulut, 2010; Poley, van der Starre, van den Bos, van Dijk, & Tibboel, 2011), Assessment of the safety culture will eventually allow a better understanding of the patient safety. The assessment is done by questionnaires for the health care providers. Safe Attitude Questionnaire (SAQ) is widespread interest in measuring of patient safety culture survey(Kaya et al., 2010).SAQ is design as a six factors models, the factors were: Teamwork Climate, Safety Climate, Perceptions of Management, Job Satisfaction, Working Conditions, and Stress Recognition. Decision-Making Trial and Evaluation Laboratory (DEMATEL) methodology has been used to solve complex and intertwined problem groups in many situations such as complex group decision making, security problems. This study aim to determine the effectiveness of patient safety culture strategies to improve patient safety in hospital, by using of DEMATEL method, to analyze the main influences to assist and guide hospital decision-makers in establishing patient safety cultural activities to enhance patient safety in priority

METHODS

DEMATEL methodology is related to visualization of the causal relationships of criteria inside networks. (Lin, 2008; Seyed-Hosseini, 2006) DEMATEL also enables researchers to determine the cause and effect factors in bidirectional relations in networks by using matrix (Matrix) and related mathematical theory to calculate the structural relationship between the impact strength criterions to establish the structural model. In general, DEMATEL operation process is structured as four sections:

Step 1: Initially direct-relation matrix

Step 2: Normalized direct-relation matrix

Step 3: Total relation matrix: calculate the initial direct / indirect relation of matrix T.

Step 4: Causal diagram

RESULTS

- The results are direct-relation matrix as follows:

Table 1

0	3	4	3	3	3
2	0	2	3	3	3
3	2	0	3	3	3
3	2	3	0	3	3
3	3	3	3	0	3
3	3	3	3	3	0

- Normalized direct-relation matrix as follows:

Table 2

0.00	0.19	0.25	0.19	0.19	0.19
0.16	0.00	0.13	0.19	0.19	0.19
0.21	0.13	0.00	0.19	0.19	0.19
0.16	0.13	0.19	0.00	0.19	0.19
0.16	0.19	0.19	0.19	0.00	0.19
0.16	0.19	0.19	0.19	0.19	0.00

- Total relation matrix: calculate the initial direct / indirect relation of matrix as follows:

Table 3

1.45	1.55	1.78	1.73	1.73	1.73
1.38	1.20	1.47	1.52	1.52	1.52
1.50	1.39	1.45	1.60	1.60	1.60
1.40	1.32	1.53	1.37	1.53	1.53
1.47	1.44	1.61	1.61	1.45	1.61
1.47	1.44	1.61	1.61	1.61	1.45

- **Causal Diagram**

According to formula, to calculate the column value of Di and the row value of Ri, and determined the central column of (Di+Ri) and impact factor of (Di−Ri). Calculation results are displayed in Table 4.

Table 4: Construction in Patient Safety Culture of the Center and Impact Factor of Influence Coefficients

	Matrix *D*	Matrix *R*	D+R	D-R
teamwork climate	9.97	8.67	18.64	1.31
safety climate	8.60	8.34	16.94	0.27
job satisfaction	9.14	9.45	18.60	-0.31
Stress Recognition	8.69	9.44	18.13	-0.75
Perceptions of management	9.19	9.44	18.63	-0.25
Working conditions	9.17	9.44	18.61	-0.26

According to Table 1, the central column of (Di+ Ri), and impact factor of (Di − Ri) has sum up and divided in 6 six factor model of the Safety Attitudes Questionnaire to get the average value. As the cause and effect factors among the matrix estimate of central tendency, and this cause and effect factors has shown in the four-quadrant matrix as displayed in figure 1:
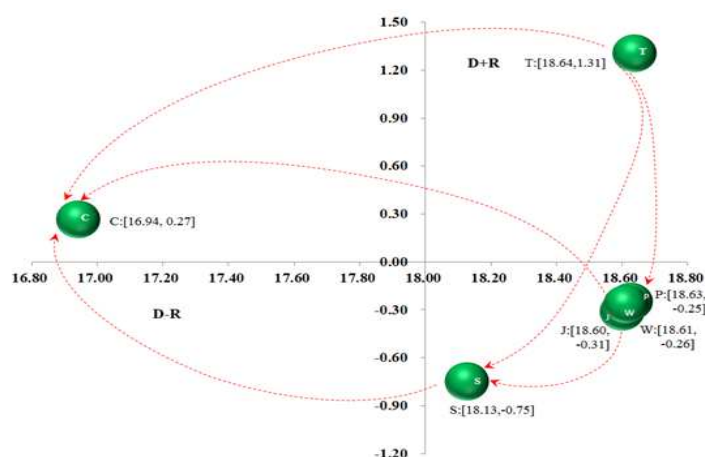
Figure 1: SAQ Factors Dimensions of Cause and Effect Matrix
(T: Teamwork climate, J: Job satisfaction, P: Perceptions of management,
W: Working conditions, S: Stress recognition, C: Safety climate)

CONCLUSIONS

For the six key dimensions to improve patient safety culture, the best strategy would be to identify "teamwork climate" as the first priority to improve on, which would subsequently improve on other dimensions thus to improve in the overall patient safety.

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Authors ' Contributions

Study concept and design: Juei-Chao Chen. Acquisition of data: Chih-Ming Chang. Analysis and interpretation of data and study supervision: Chih-Ming Chang; Juei-Chao Chen. Drafting the manuscript: Chih-Ming Chang Statistical analysis: Chi-Hung Kao1; Wei-Shun Sha

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